

Sub. B2

What is claimed is:

1. A process for the treatment of waste water, comprising the steps of:
drawing waste water into a vessel containing an activated sludge;
mixing the waste water and the activated sludge in the vessel to create a mixture;
exposing the mixture in the vessel to anaerobic conditions for a sufficient time to permit the release of phosphorous and denitrification of oxidized nitrogen;
exposing the mixture in the vessel to alternating periods of aerobic and anoxic conditions for a sufficient time to permit the oxidation of organic contaminants in the waste water and nitrogenous waste products and the uptake of phosphorous followed by the denitrification of oxidized nitrogen;
extracting the mixture from the reactor while exposing the mixture to alternating periods of aerobic and anoxic conditions; and
passing the mixture through a membrane unit to separate suspended solids in the mixture from liquid.
2. The process of claim 1 wherein said steps of mixing the waste water and the activated sludge in the vessel

to create a mixture and exposing the mixture in the vessel to anaerobic conditions for a sufficient time to permit the release of phosphorous and denitrification of oxidized nitrogen are completed in about 15 minutes.

3. The process of claim 1 wherein the step of exposing the mixture in the vessel to alternating periods of aerobic and anoxic conditions for a sufficient time to permit the oxidation of organic contaminants in the waste water and nitrogenous waste products and the uptake of phosphorous followed by the denitrification of oxidized nitrogen is completed in about 45 minutes.

4. The process of claim 1 wherein the steps of extracting the mixture from the reactor while exposing the mixture to alternating periods of aerobic and anoxic conditions and passing the mixture through a membrane unit to separate suspended solids in the mixture from liquid are completed in about 60 minutes.

5. A device for the treatment of waste water, comprising: a bioreactor containing an activated sludge therein; a filtration unit including a membrane; one or more valves for controlling the flow into the bioreactor;

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Sub. B3

one or more pumps for controllably pumping waste water into the bioreactor;

one or more mixers for mixing the waste water with the activated sludge in the bioreactor to create a mixture;

one or more blowers for controllably aerating the waste water and activated sludge in the bioreactor at designated intervals;

one or more valves for controlling the flow of the mixture from the bioreactor to the filtration unit; a pump for pumping the mixture through the membrane of the filtration unit such that solids in the mixture are separated from liquid in the mixture; and,

one or more valves for controlling the return flow of the mixture from the filtration unit to the bioreactor.

6. A device for the treatment of waste water, comprising:
a first bioreactor containing an activated sludge therein;
a second bioreactor containing an activated sludge therein;
a filtration unit including a membrane;
one or more valves for controlling the flow into the first and second bioreactors at designated intervals;

one or more pumps for controllably pumping waste water into the first and second bioreactors at designated intervals;

one or more mixers for mixing the waste water with the activated sludge in the first and second bioreactors to create a mixture in each bioreactor; one or more blowers for controllably aerating the waste water and activated sludge in the first and second bioreactors at designated intervals;

one or more valves for controlling the flow of the mixture from each of the first and second bioreactors to the filtration unit;

one or more pumps for pumping the mixture through the membrane of the filtration unit such that solids in the mixture are separated from liquid in the mixture;

one or more valves for controlling the return flow of the mixture from the filtration unit to each bioreactor;

wherein, as the first bioreactor performs mix fill and react fill phases of operation, the second bioreactor performs a react discharge phase of operation and as the first bioreactor performs the react discharge phase of operation, the second bioreactor performs the mix fill and

react fill phases of operation.

Add B4

Add C1

DOCKET NO. 2946

device with the sequencing batch reactor process eliminates the necessity to provide appropriate time periods for a quiescent environment for solids/liquid separation and the requirement of mechanical decanter devices normally required to extract the desired effluent quality in conventional sequencing batch reactor systems.

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